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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,496	02/28/2002	Geun-young Yeom	061887	2172

22428 7590 09/27/2004

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EXAMINER	
CROWELL, ANNA M	
ART UNIT	**PAPER NUMBER**
1763	

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,496	YEOM ET AL.	
	Examiner	Art Unit	
	Michelle Crowell	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claim 1, 5-6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (JP 01081198 A) in view of Mitsushima (JP 61185750 A).

Referring to Drawings 1, 2, 3 and the abstract, Nagai discloses an apparatus using a neutral beam comprising: an ion source 21 for extracting and accelerating an ion beam having a predetermined polarity; a reflector 24 having a plurality of reflector passages, the reflector passages communicating with the grid holes such that the ion beam passed through the grid holes is reflected by surfaces of the reflector passages and neutralizing the ion beam into a neutral beam;

Nagai fails to teach a grid having a plurality of grid holes through which the ion beam passes and a stage.

Referring to the abstract, Mitsushima teaches a beam apparatus having an ion beam passing through a cylindrical grid 13 order to form uniform, parallel ion beams. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide a grid as taught by Mitsushima to the apparatus of Nagai in order to form uniform, parallel ion beams.

Referring to the abstract, Mitsushima teaches it is conventionally known in the art for a beam apparatus to have a stage 17 for holding a substrate to be processed. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Nagai with the stage as taught by Mitsushima since it is conventionally known in the art to provide a beam apparatus with a stage in order to securely hold the substrate for processing.

With respect to claim 5, the etching apparatus of Nagai wherein the reflector passages 24 are slanted with respect to an advancing direction of the ion beam so that the ion beam passing through the grid holes and advancing straight is reflected by the surfaces of the reflector passages.

With respect to claim 6, the etching apparatus of Nagai wherein the reflector passages 24 are non-parallel with a central axis of the reflector.

With respect to claim 9, the apparatus of Nagai further includes that the reflector is formed of a metal substrate 25.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (JP 01081198 A) in view of Mitsushima (JP 61185750 A) as applied to claims 1, 5-6, and 9 above, and further in view of Yunogami et al. (Development of neutral-beam-assisted etcher).

The teachings of Nagai in view of Mitsushima have been discussed above.

Nagai in view of Mitsushima fails to teach a retarding grid.

Referring to page 955, column 1, line 18- page 955, column 2, line 1, Yunogami et al. teaches providing retarding grids in a neutral beam assisted etcher in order to eliminate all ions. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the apparatus of Nagai in view of Mitsushima with a retarding grid as taught by Yunogami et al. since this would further eliminate ions.

5. Claims 3, 4, 7 and 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (JP 01081198 A) in view of Mitsushima (JP 61185750 A) as applied to claims 1, 5-6, and 9 above, and further in view of Albridge, Jr. et al. (U.S. 4,775,789).

The teachings of Nagai in view of Mitsushima have been discussed above.

Nagai in view of Mitsushima fails to teach reflector passages are parallel with a central axis of the reflector, reflector passages having an angle between 5^{o} to 15^{o}, and a cylindrical shaped reflector with a circular section.

Referring to Figures 2, 3, 5, and 6 and column 3, line 18-column 4, line 19, Albridge, Jr. et al. teaches an etching apparatus having reflector passages 12, 16 that are parallel with a central axis of the reflector in order to produce a converging or diverging neutral beam (col. 4, lines 1-19). Additionally, the reflector may have a cylindrical shape with a circular section(col. 4, lines

15-19). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the reflector passages of Nagai in view of Mitsushima to be slanted to an advancing direction of an ion beam and have a cylindrical shape with a circular section as taught by Albridge, Jr. et al. in order to produce a converging or diverging neutral beam.

Nagai fails to teach a reflected angle between 5° to 15°.

Referring to column 3, lines 26-55, Albridge, Jr. et al. discloses using a reflected angle between 1° to 4° to achieve high efficiency neutralization. Additionally, as the angle increases, the efficiency decreases. Furthermore, the percentage of neutralization is a function of the angle. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the reflector passages of Nagai in view of Mitsushima with a reflected angle between 5° to 15 ° as taught by Albridge, Jr. et al. in order to achieve the desired percentage of neutralization. In addition, in Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), the Federal Circuit held that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device.

With respect to claim 11, the apparatus of Nagai in view of Mitsushima and Albridge, Jr. teaches a circular section of the reflector passage and grid holes. Nagai in view of Mitsushima and Albridge, Jr. fails to expressly disclose the diameter of the reflector passage being equal to or greater than the respective grid hole. However, a prima facie case of obviousness still exists because it would have been obvious to one of ordinary skill in the art to optimize the diameter of

the grid or the reflector passage during routine experimentation depending upon, for example, beam flow rate, and would not lend patentability to the instant application absent the showing of unexpected results.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nagai (JP 01081198 A) in view of Mitsushima (JP 61185750 A) as applied to claims 1, 5-6, and 9 above, and further in view of Yoshida et al. (4,859,908).

The teachings of Nagai in view of Mitsushima have been discussed above.

Nagai in view of Mitsushima fails to teach the ion source is an inductively coupled plasma source.

Referring to Figure 9 and column 1, lines 21-24, Yoshida et al. teaches that it is conventionally known in the art to use an inductively coupled plasma source as the ion source. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention for the ion source of Nagai in view of Mitsushima to be an inductively coupled plasma source as taught by Yoshida et al. since it is conventionally known in the art to use an inductively coupled plasma source as the ion source. Additionally, inductively coupled plasma source is an equivalent source for producing ions.

Response to Arguments

7. Applicant's arguments with respect to claims 1-11 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Crowell whose telephone number is (571) 272-1432. The examiner can normally be reached on M-F (8:00 - 4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (571) 272-1439. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

AMC
09-21-04

SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700